

Modular NanoSat Launcher Design for Lowest Mission Cost, Phase I

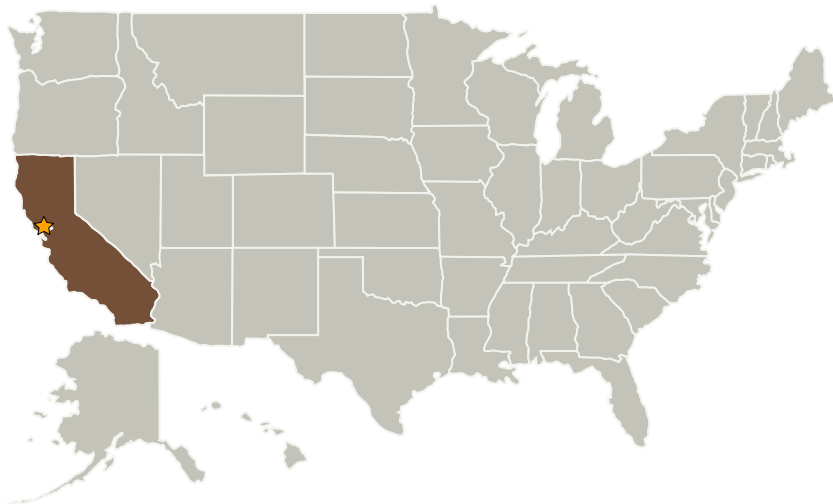


Completed Technology Project (2009 - 2009)

Project Introduction

As minimum cost will be required for a dedicated NanoSat Launch Vehicle, a series and parallel staged, highly modular vehicle architecture is proposed for design exploration. The principal advantage of a modular architecture on this size vehicle is a single propulsion development at a relatively small scale which drastically shortens development timelines and cost. A candidate launch vehicle could use 7 modules for the first stage, 4 for the second, 2 for the third, and 1 for the fourth. Whittinghill Aerospace proposes to investigate many modular designs for 3, 4, and 5 stage vehicles of different (solid, liquid, and hybrid) propellant types. Structural, aerodynamic, propulsion, and control configurations of vehicles will be optimized and "flown" with a trajectory tool to evaluate performance. After trades and analyses are completed and designs ranked, the resulting optimum module size will then be built and tested at an anticipated 1 to 3Klb thrust level. At the conclusion of Phase 1, the technology will be ready for flight development and will be at a TRL level of 5. At the end of Phase 2, a full-scale, 2-stage sub-orbital modular vehicle will have flown.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center (ARC)	Lead Organization	NASA Center	Moffett Field, California
Whittinghill Aerospace, LLC	Supporting Organization	Industry	Camarillo, California



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.2 Launch Vehicle Propellant